

https://dspace.org/

# Dental Research Institute: silent contribution of fifty years: 1954-2004

**Cleaton-Jones, P.; Grossman, E.**

**2004**

http://hdl.handle.net/10539/19512

Cleaton-Jones, P., Grossman, E. Dental Research Institute: silent contribution of fifty years: 1954-2004. South African journal of science; 100(7-8):316-318

Downloaded from a DSpace repository. https://dspace.org/

# Dental Research Institute: silent contribution of fifty years: 1954–2004

**Peter Cleaton-Jones**[*†] **and Elly Grossman**[*]

*The Dental Research Institute at the University of the Witwatersrand celebrates its 50th year in 2004. This article gives background into its formation and activities.*

## Introduction

On 1 April 2004, the Dental Research Institute at the University of the Witwatersrand marked its 50th Jubilee with a grand celebration at the Museum of Medical History at the Wits Medical School, attended by some 200 guests. Although this internationally recognized research unit has been active since 1954, when dental research actually began in South Africa has, to our knowledge, never been determined. The first formal report, on the oral health of African adults around Johannesburg, was in the *British Dental Journal*.[1] This was followed by a field survey in the then Natal,[2] and later by other surveys — at the time epidemiology was the favoured research method, with concentration on the rates of dental caries.[3–6] Middleton-Shaw, recognized as the doyen of dental education in South Africa, broke this pattern with his interest in dental comparative anatomy;[7] later, Cohen[8] reported on the pathogenesis of periodontal disease.

After the Second World War, the CSIR encouraged health research through its Committee on Research in the Medical Sciences and formed a number of collaborative units with universities. These included two dental research units, one formed at the University of the Witwatersrand in 1954, and a second at the University of Pretoria that closed in the mid-1960s.

Much of the origins of the joint CSIR / University of the Witwatersrand Dental Research Unit remain shrouded in mystery: why it was formed, who the prime motivator was, and its exact starting date in 1954 have been lost but, based on the government financial year, inception has been accepted as the first of April. Whatever the reason for its creation, the dental community owes an enormous debt of gratitude to the CSIR and Wits for their foresight and particularly to those people actually involved in the formation of the unit. The joint CSIR/Wits relationship lasted from 1954 until 1968,[9] after which, on 1 January 1969, the newly formed South African Medical Research Council (MRC) came into being. The MRC assumed the medical research responsibilities of the CSIR, which included the Dental Research Unit (DRU). It was one of the 24 original MRC units or groups at South African universities and the SAIMR and, in July 2004, is the only survivor of those original units.[10] In 1978 the MRC spontaneously changed the unit to an institute: an event regarded by Andries Brink, the then MRC president, as significant enough to be included as one of the important dates in medical research in South Africa.[11] The establishment of the DRU as an institute indicated its elevated structure and more permanent nature, which remains until the end of 2004, when MRC status ceases in accordance with their policy of unit turnover.

There have been four directors, each with primary research interests. James Irving (1954–59) (Fig. 1) was the first and was a University of Cape Town medical graduate with a passion for mineral metabolism and calcification.[12] He immediately established the high research standards continued by his successors and supervised the first Ph.D. in the DRU by Clive Solomons,[13] an engineer, who studied amino acids and calcification and later ran a research laboratory in the United States. Irving had an eye for talent and stimulated Anthony (Tony) Melcher, a dentist in general practice in Johannesburg, who subsequently became director of the Canadian MRC Research Group in Periodontology, vice-provost of the University of Toronto and president of the International Association for Dental Research. Before moving to Harvard University, Irving also recruited Jan Dreyer (Fig. 2), an orthodontist with a degree in biochemistry who became the second director (1960–70).

Dreyer's research direction was influenced by his orthodontic experience, so he studied bone healing after orthodontic treatment, surgery and bone infection.[14] In this he gained an international reputation notably for his concept that healing of a bony defect was a 'race' between fibrous tissue and osteogenic tissue; whichever 'won', defined the outcome. During Dreyer's directorship, Leah Mendelsohn, a biochemist, was the first woman Ph.D. graduate from the unit.[15] Dreyer was a member of the Government Commission of Enquiry into the Fluoridation of Public Water Supplies that unanimously recommended fluoridation for South Africa.[16] Regretfully, while recent legislation has been enacted to facilitate this implementation, it has not yet occurred 38 years later.

The successor to Dreyer was Hugo

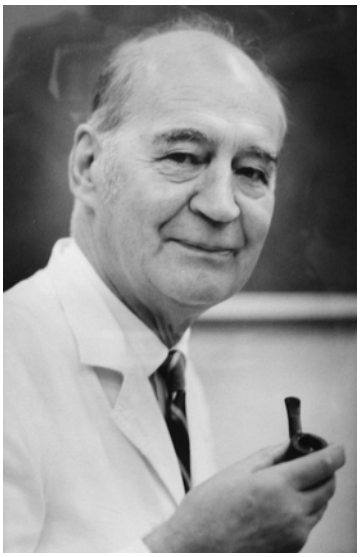

**Fig. 1**. James Irving, director 1954–59; moved to Harvard University, U.S.A.



**Fig. 2**. Cornelius Jan Dreyer, director 1960–70; became dean of the Faculty of Dentistry at Wits.

*Dental Research Institute, University of the Witwatersrand, WITS 2050, South Africa.
†Author for correspondence.
E-mail: cleatonjonesp@dentistry.wits.ac.za

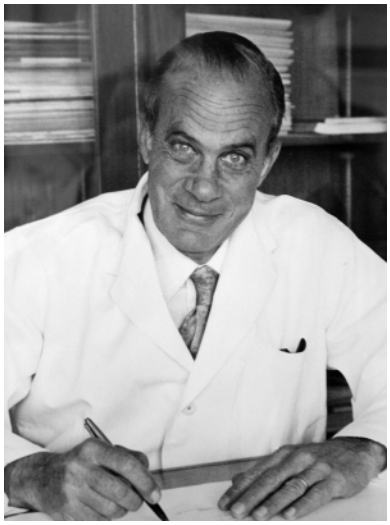

**Fig. 3**. Daniel Hugo Retief, director 1970–76; recruited by the University of Alabama at Birmingham, U.S.A.

Retief (1970–76) (Fig. 3), a dentist with a master's degree in chemistry who focused much of his energy on adhesives in dentistry.[17] Retief was a pioneer in the bonding of orthodontic brackets directly to teeth. In times past, the brackets, to which orthodontic spring wires were attached, were welded onto a metal band that surrounded a tooth. The problem with this, besides poor appearance, is that the thickness of metal between teeth restricts the space available for tooth movement. Direct bonding does away with the need for a circumferential band, makes space available and is standard practice today.

Peter Cleaton-Jones (Fig. 4), a dental and medical graduate, who has been director since 1977, has a particular interest in the epidemiology of dental caries[18] and in the training of novice researchers. He has followed the natural history of dental caries in Germiston nursery school children for many years[19] and has conducted systematic reviews of caries trends in developing countries in Africa, the Middle East, the Caribbean and South America.[20] These reviews show that, contrary to the perception that dental caries is increasing in developing countries, rates are in fact falling and results for Germiston suggest that there may be a periodicity to the condition.



**Fig. 4**. Peter Eiddon Cleaton-Jones, director 1977–2004.

After 50 years, it is reasonable to look at the contribution of the institute to academia, research and society which, in a short article, must be restricted to a rather dry listing.

### Contribution to academia

Postgraduate output has been good — 106 master's and doctoral degrees have been completed though the institute. Graduates comprise 30 dental general practitioners, 61 dental specialists plus 15 colleagues in other disciplines. Among graduates, many have attained prominent positions or have headed an academic department in South Africa or abroad. These include:

- Fred Barbakow (University of Zurich Dental School, Switzerland);
- Pamela McInnes (National Institutes of Infectious Diseases of the National Institutes of Health, U.S.A.);
- Hugo Retief and Lionel Sadowsky (University of Alabama in Birmingham, U.S.A.);
- John Wolfaardt (University of Alberta, Canada);
- John Lownie, Les Carr, Bernard Joffe, Sidney Setzer, and Mervyn Shear (University of the Witwatersrand).

Also, two research units have been awarded to institute graduates; in Canada to Anthony Melcher (the Canadian MRC Research Group in Periodontology) and in South Africa to Ugo Ripamonti (MRC/Wits Bone Research Laboratory).

The DRI has undertaken collaborative research with colleagues at each of the dental schools in South Africa. To this one may add approximately 387 individuals from South Africa and abroad who have collaborated and published papers with institute staff. Presently, in the institute, co-authorship is being examined as a potentially better indicator of 'research environment health' than others such as impact factor and citation indexes.[21] In this capacity the DRI appears to be particularly healthy.

### Contribution to research

Research output by the DRI, at July 2004, consists of 610 scientific papers published in peer-reviewed journals, book chapters, technical reports, editorials, letters to editors and other printed material. Initial research was of a basic nature and laboratory centred, as was generally the case at that time. However, research focus has gradually moved to the community and clinic, becoming more patient orientated, with the field of research incorporating the dental practitioner at his or her dental chair and using the laboratory to obtain solutions to clinical problems. Publications arising from these studies cover all aspects of oral health from anatomy of the oral soft tissue to chemical and mechanical aspects of restorative materials — a set of 12 bound volumes containing all published papers has been given to the MRC and to Wits for their archives.

In order to ease the path of budding researchers, a general research methods course was initiated to ensure capacity building in scientific investigative techniques. Since 1978, 1355 individuals of every imaginable biomedical discipline, from within and outside South Africa's borders, have attended the 50-hour research training course run by the institute. Until recently, this was the only such training course available to postgraduates in the clinical discipline. Attendees at this course have introduced similar courses at their home institutions, so the influence of the institute on research in South Africa is wide.

The research carried out in the Institute has been shared with colleagues in South Africa through the annual congress of the South African Division of the International Association for Dental Research (SA IADR). Of the 43 delegates who attended the inaugural meeting of the SA IADR in 1967, seven completed higher degrees through the DRI and 17 published research done in collaboration with the institute. The institute has presented no fewer than 433 oral contributions at the annual meetings.

### Contribution to society

Contribution to society is difficult to measure objectively. Many of the institute graduates have gone back to clinical practice in dentistry, without publishing further research. While some may feel that the people have not put their hard-won research training to good use, we are constantly told by this group that this training has made them into life-long learners. They use the critical skills gained during their postgraduate qualification to assess and evaluate their own clinical work; they are much more discriminating of new products and are totally familiar

with information retrieval to solve clinical questions. This has made them insightful practitioners to the benefit of their patients.

### Influences outside dentistry

Others, outside of the field of dentistry, have availed themselves of DRI expertise. Of the 106 higher degrees completed through the institute, 15 have been to individuals in disciplines such as the basic sciences, engineering medicine and nutrition; two have been medical technologists, who were able to upgrade their skills and obtain M.Sc.(Dent) degrees. Of the 13 currently registered with the DRI to complete higher degrees, seven are non-dentists. The research techniques course has similarly been attractive to non-dentists; of the total of 1355 attendees, over 70% are in fields other than dentistry such as the basic sciences, medicine, nursing, occupational therapy, pharmacy and physiotherapy.

The DRI has been a participant, from the beginning, in the large Birth to 20 Study, which examines the progress of a cohort of children born in 1990 — contributing nutritional and dental assessments. The richness of the study data which have been gathered to date, and will continue to the year 2010, is beyond price.

### Miscellaneous

Interestingly, both the first successful male and female postgraduates were non-dentists and both coincidentally completed Ph.D.s.[13,15] The DRI has also attracted family graduates: Kim Mizrahi (Ph.D. 1980) and son Basil (M.Sc.(Dent) 1993); Archie Buskin (M.Dent 1980) and son Rowan (M.Sc.(Dent) 1996); and the father-in-law, daughter-in-law and brother combination of Shaun Williams (M.Sc.(Dent) 1982), Frances Thompson (post BDS MRC scholar 1996) and Richard Thompson, currently a Ph.D. candidate.

Of prizes there have been many. Undergraduates and postgraduates have won prizes for research presentations at the annual congress of the South African Division of the International Association for Dental Research. Cleaton-Jones, the current director, has been honoured by the Medical Research Council, the South African Association for Dental Research and the South African Association for the Advancement of Science as well as receiving an honorary Ph.D. from Medunsa.

The most recent award, the annual Dental Development Fund Award for the best paper by an author under 35 years of age published in the *South African Dental Journal,* perhaps embodies the research spirit which the DRI has strived to foster over the past 50 years. For 2003 this was awarded to Jacques Lightfoot and Fiona Clarke, who published a paper on research done and written up through the DRI while still undergraduates.[22] The enquiry and inquisitiveness which the two displayed, the persistence of their investigation and the calibre of the written work won them the award. It is this spirit of enquiry that the institute has kindled in all those who have come into contact with it.


1. Friel G. (1910). Teeth of African natives in Johannesburg. *Br. Dent. J.* **31**, 729–731
2. Suk V. (1919). Eruption and decay of permanent teeth in whites and negroes, with comparative remarks on other races. *Am. J. Phys. Anthropol.* **2**, 351–366.
3. Leipoldt C.L. (1926). The carious teeth of native children. *Br. J. Dent. Sci.* **69**, 329–340.
4. Oranje P., Noriskin J.N. and Osborn T.W.B. (1935). The effect of diet upon dental caries in the South African Bantu. *S. Afr. J. Med. Sci.* **1**, 57–62.
5. Staz J. (1938). Dental caries in South Africa. *S. Afr. J. Med. Sci.* **3**, 1–63.
6. Ockerse T. (1941). Endemic fluorosis in the Kenhardt and Gordonia districts, Cape Province, South Africa. *J. Am. Dent. Assoc.* **28**, 936–941.
7. Middleton-Shaw J.C. (1930). *The teeth, the bony palate and the mandible in the Bantu races of South Africa.* D.D.S. thesis, University of the Witwatersrand, Johannesburg.
8. Cohen B. (1959). *The pathogenesis of pyorrhoea alveolaris.* D.D.S. thesis, University of the Witwatersrand, Johannesburg.
9. Cleaton-Jones P. (1985). The Dental Research Institute at Wits 1954–1985. *J. Dent. Ass. S. Afr.* **40**, 723–725.
10. Medical Research Council (1970). *First Annual Report 1969-1970.* Pretoria.
11. Brink A.J. (ed.)(1988). *South African Medical Research: Twenty Years of Growth.* Owen Burgess, Cape Town.
12. Irving J.T. (1958). A comparison of the influence of hormones, vitamins and other dietary factors upon the formation of bone, dentine and enamel. *Vitamins and Hormones* **15**, 291–323.
13. Solomons C.C. (1957). *An investigation into some of the organic constituents of soft and hard tissue of the body.* Ph.D. thesis, University of the Witwatersrand, Johannesburg.
14. Dreyer C.J. (1954). The living bone. *Int. Dent. J.* **14**, 18–32.
15. Mendelsohn L. (1962). *Certain aspects of the oxidative metabolism of oral tissues with specific reference to Vitamin D.* Ph.D. thesis, University of the Witwatersrand, Johannesburg.
16. McKenzie W.J., Becker B.J.P., Dreyer C.J., Du Toit J., Dowdle E.B.D. and De Graad J.W. (1966). *Report of the Commission of Enquiry into Fluoridation.* Government Printer, Pretoria.
17. Retief DH. (1975). *The direct bonding of orthodontic attachments.* Ph.D. thesis, University of the Witwatersrand, Johannesburg.
18. Cleaton-Jones P.E. (1991). *Studies on dental caries in South African populations.* D.Sc.(Dent) thesis, University of the Witwatersrand, Johannesburg.
19. Cleaton-Jones P.E, Williams S.D.L. and Fatti L.P. (2000). Surveillance of primary dentition caries in Germiston, South Africa, 1981–97. *Community Dent. Oral. Epidemiol.* **24**, 267–273.
20. Cleaton-Jones P. (2001). Dental caries trends in 5 to 6 year-old and 11 to 13 year-old children in two UNICEF-designated regions: sub-Saharan Africa, and Middle-East and North Africa 1970-2000. *J. Israel Dent. Ass.* **18**, 11–22.
21. Newman M.E.J. (2004). Coauthorship networks and patterns of scientific collaboration. See http://www.pnas.org/cgi/doi/10.1073/pnas.0307545100
22. Lightfoot J, Clarke F.M. and Grossman E.S. (2003). How well do fourth year dental students place composite resin? *S. Afr. Dent. J.* **58**, 56–61.


## Forthcoming conferences

**World Conference on Physics and Sustainable Development** will be held in Durban, from 31 October 2 November 2005, as part of the celebration of the World Year of Physics, the 100th anniversary of Einstein's *annus mirabilis*, in which he published three of his most famous papers. The conference will be co-sponsored by UNESCO, the Abdus Salam International Centre for Physics, the International Union of Pure and Applied Physics, and the South African Institute of Physics. The IUPAP General Assembly will meet in Cape Town immediately before the conference, from 25 29 October.

The conference is intended to serve as the first global forum to focus the physics community towards development goals and to create new mechanisms of cooperation for their achievement. Four themes have been chosen for the occasion: Physics and Economic Development, Physics and Health, Energy and the Environment, and Physics Education.

Further details will become available in due course from the following websites: www.iupap.org and www.saip.org.za.

**SASQUA 2005**. The Southern African Society for Quaternary Research will hold its XVI conference from 30 March 3 April 2005 at the University of the Free State in Bloemfontein. The organizers are the departments of Plant Science, Geography, and Geology at the university, and the National Museum, Bloemfontein.

**Further information** is available from Rina Immelman, Geology Department, University of the Free State, P.O. Box 339, Bloemfontein 9300; e-mail: sasqua@mail.uovs.ac.za; www.uovs.ac.za/sasquaxvi